Jet Shapes with MidPoint

(update+blessing)

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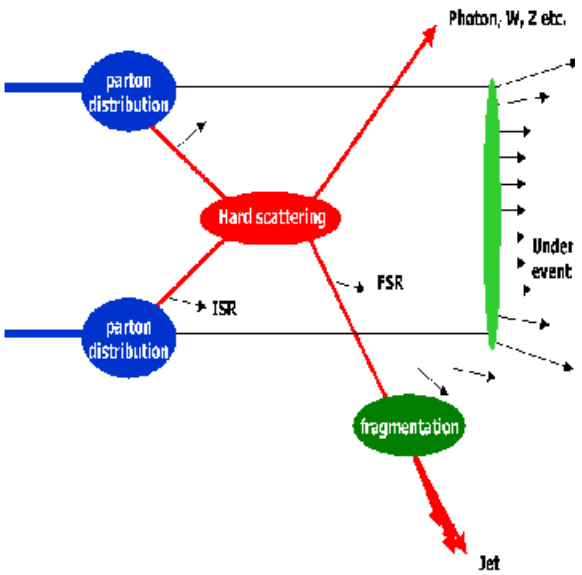
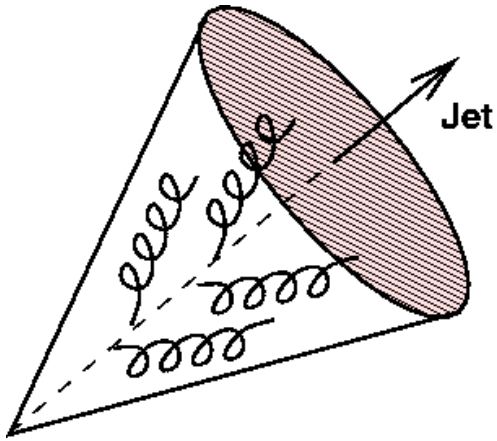
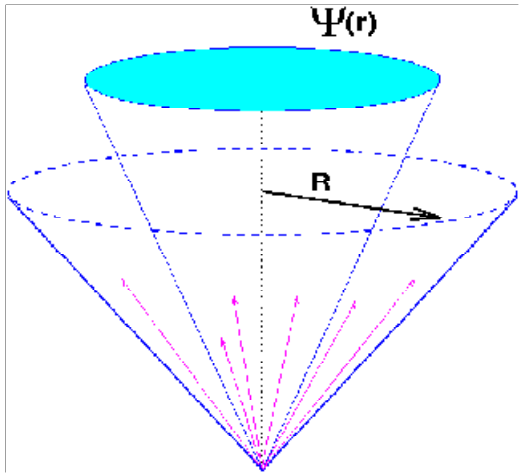
CDF QCD Meeting, July 23th 2004

Updates



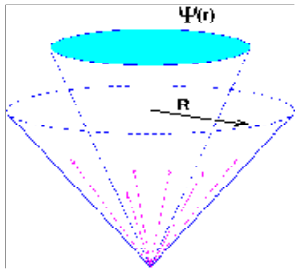


- List from GP discussion
  - ✓ Smooth curves in some predictions
  - ✓ Include other PYTHIA predicitions
  - ✓ Check Effect on COT efficiency DATA vs MC…is within quoted systematic error (?)

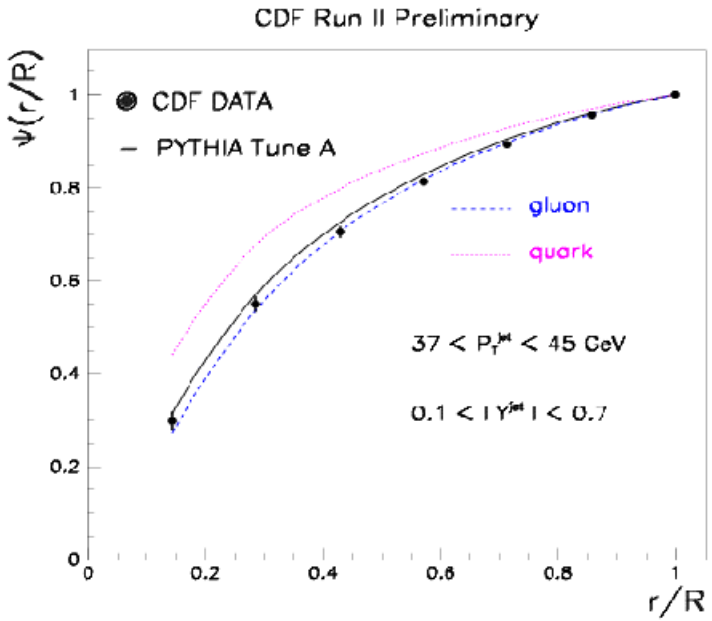


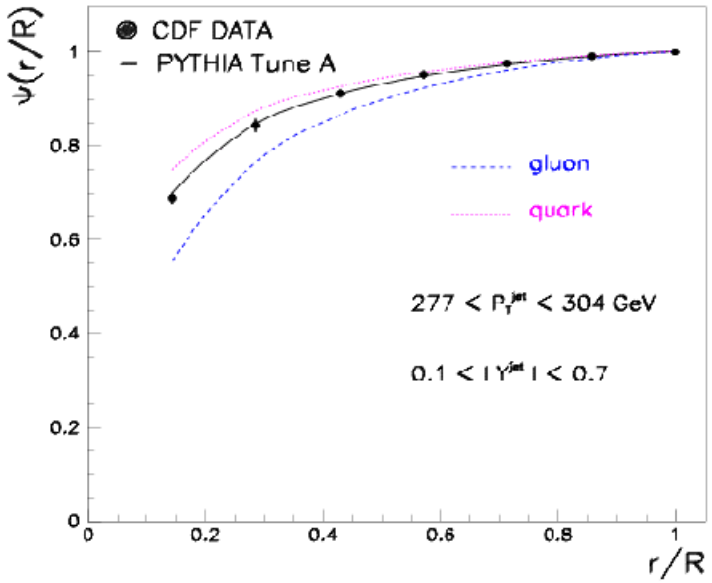
$$\Psi(r) = \frac{1}{N_{jets}} \Sigma_{jets} \frac{P_T(0,r)}{P_T^{jet}(0,R)}$$

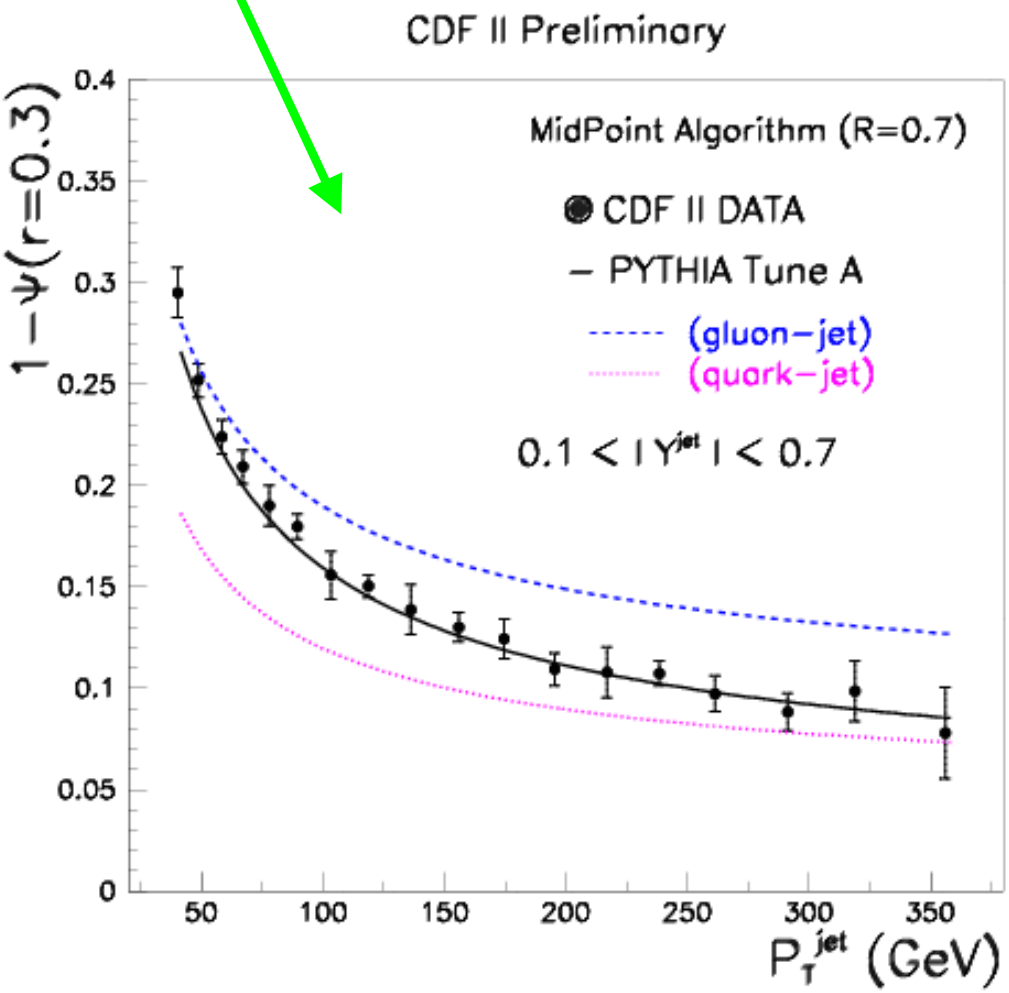
Jet shapes



Now smooth







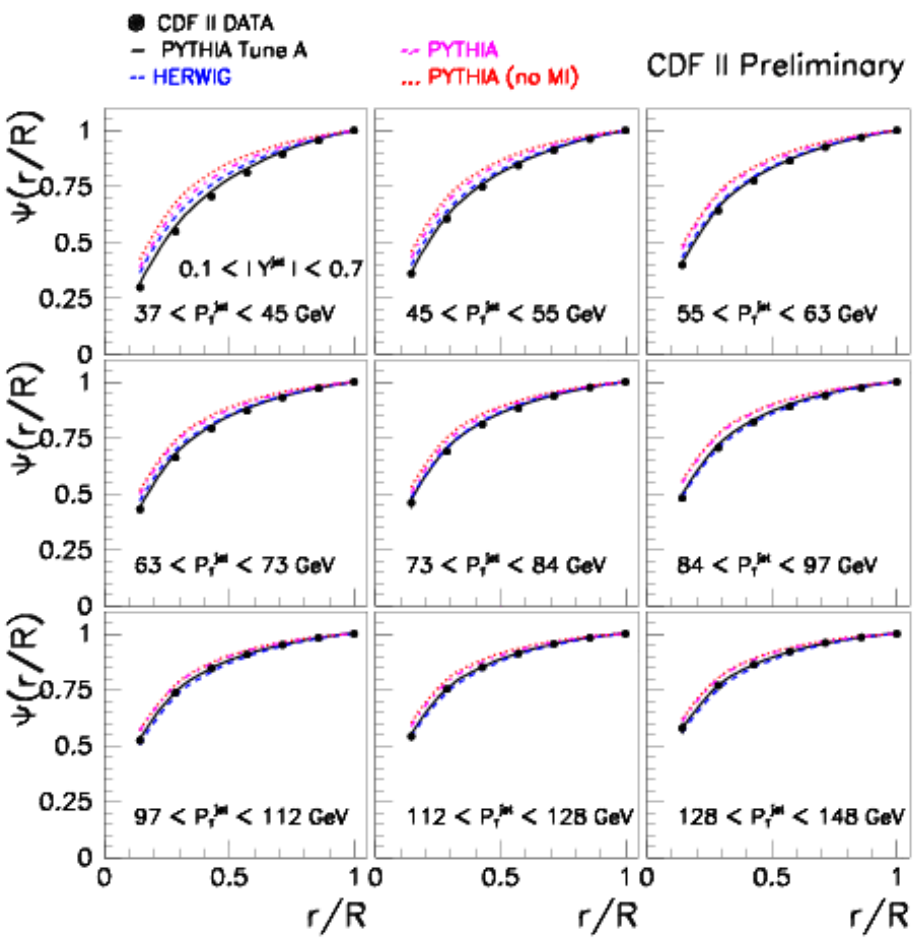
PYTHIA MC generation

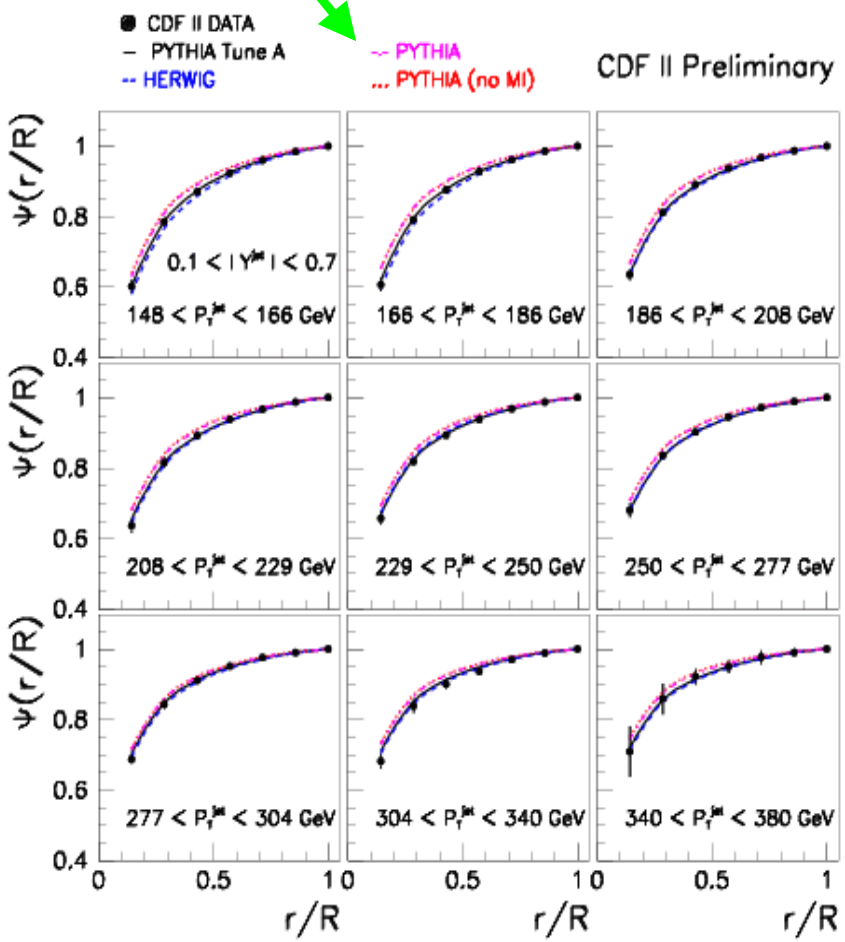
- PYTHIA MC (no simulation) to produce predictions for:
  - PYTHIA default
  - PYTHIA default (no Multiple Interactions)
  - PYTHIA Tune A (x2 list below)
- Available on CAF at fcdfdata115:
  - Pt hard > 18 GeV : 5M events each
  - Pt hard > 40 GeV : 2M events each
  - Pt hard > 60 GeV : 2M events each
  - Pt hard > 90 GeV : 2M events each
  - Pt hard > 120 GeV : 1M events each
  - Pt hard > 150 GeV : 1M events each
  - Pt hard > 200 GeV : 1M events each

Jet shapes

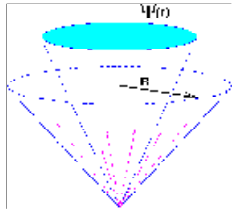
For blessing

For blessing

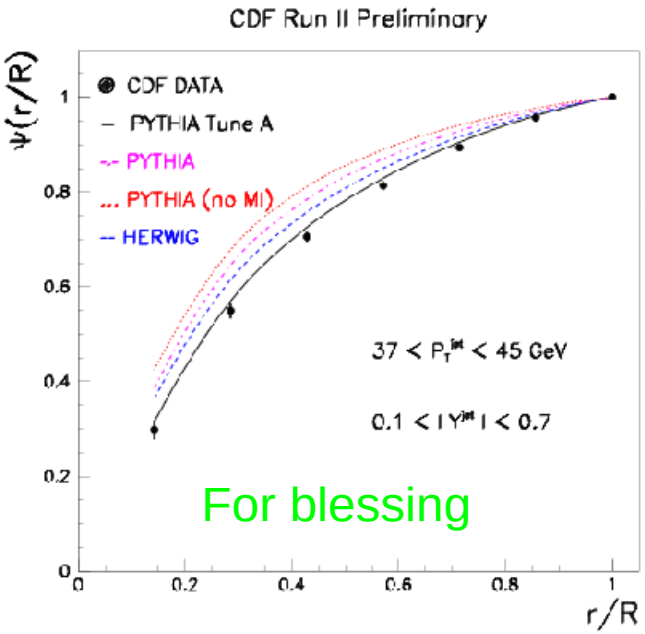


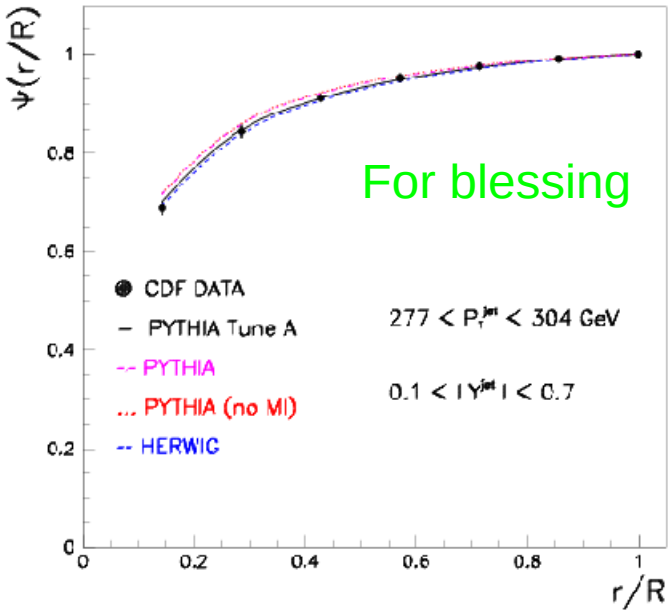


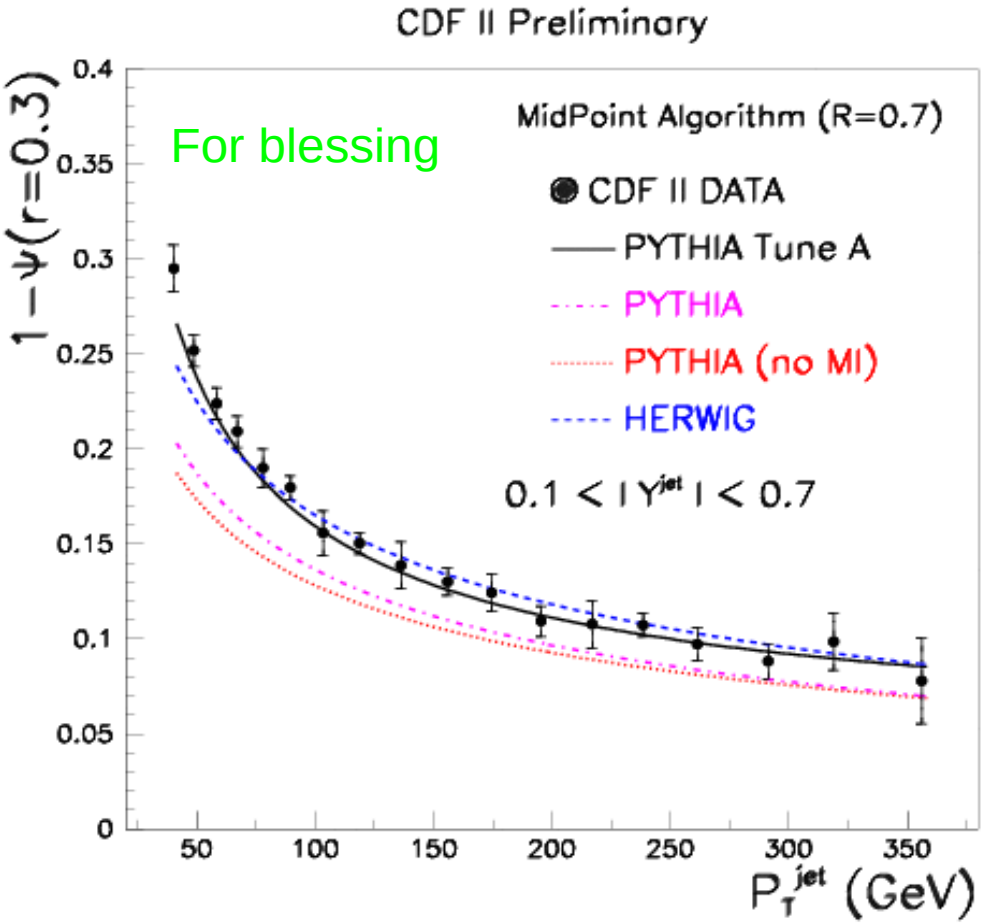
Jet shapes



- PYTHIA Tune A → describes data
- PYTHIA default clearly off
- PYTHIA default (w/wo MI) similar

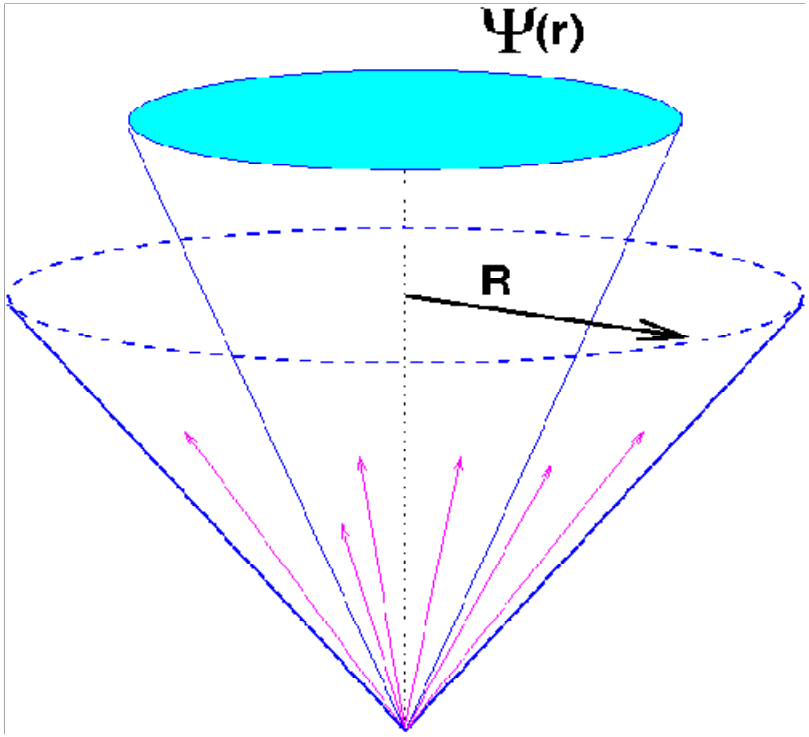






COT Efficiency within Jets

- There is a slightly different tracking efficiency for tracks inside jets for DATA and MC
- This is a function of r → thus it can potentially affect the shape of the jet…
- GP asked authors to make sure this is inside systematics….
- the answer is YES…(effect <0.5 %)

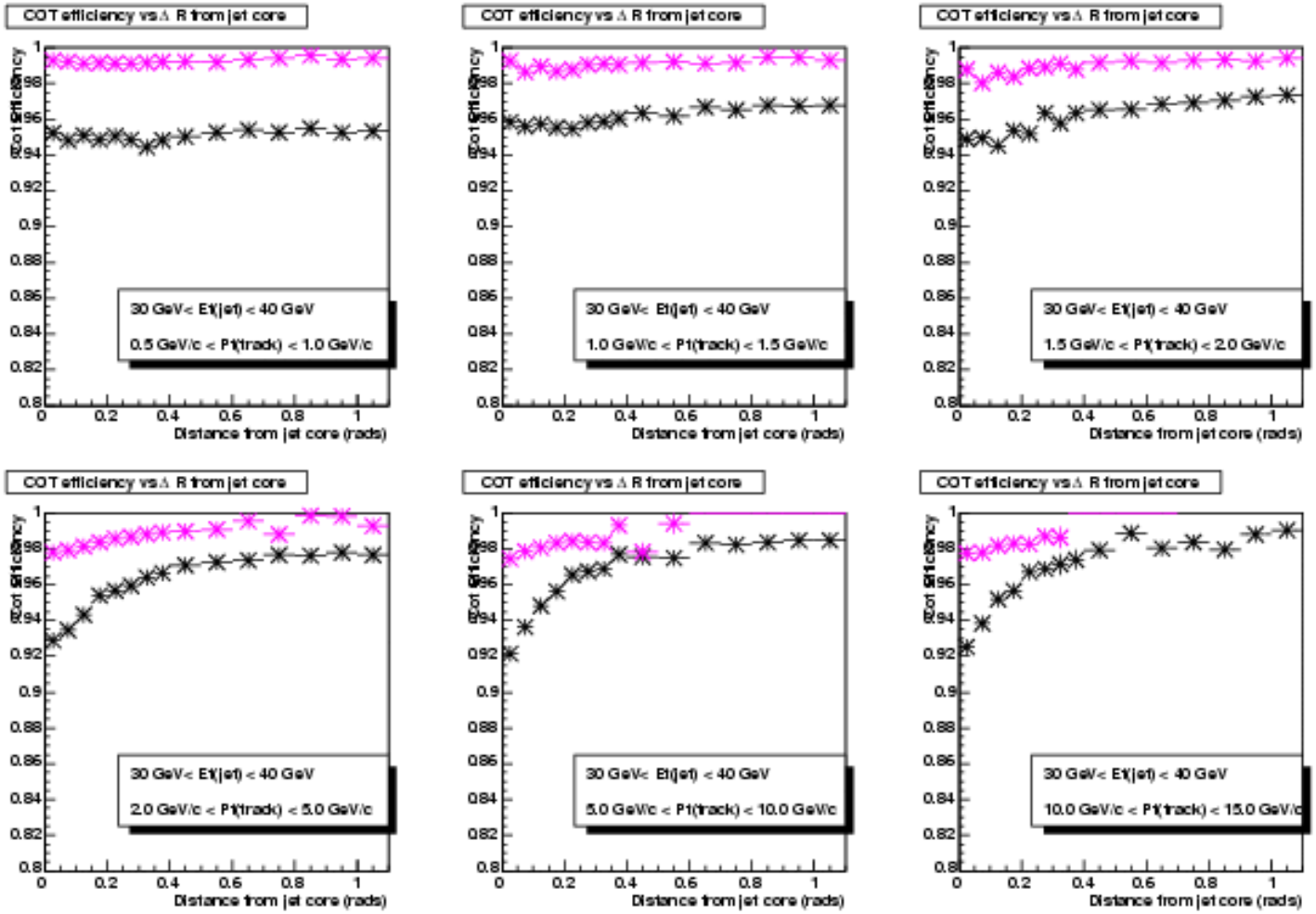


Thanks to Simon Sabik !!

Track Efficiency in Data and MC

MC

DATA



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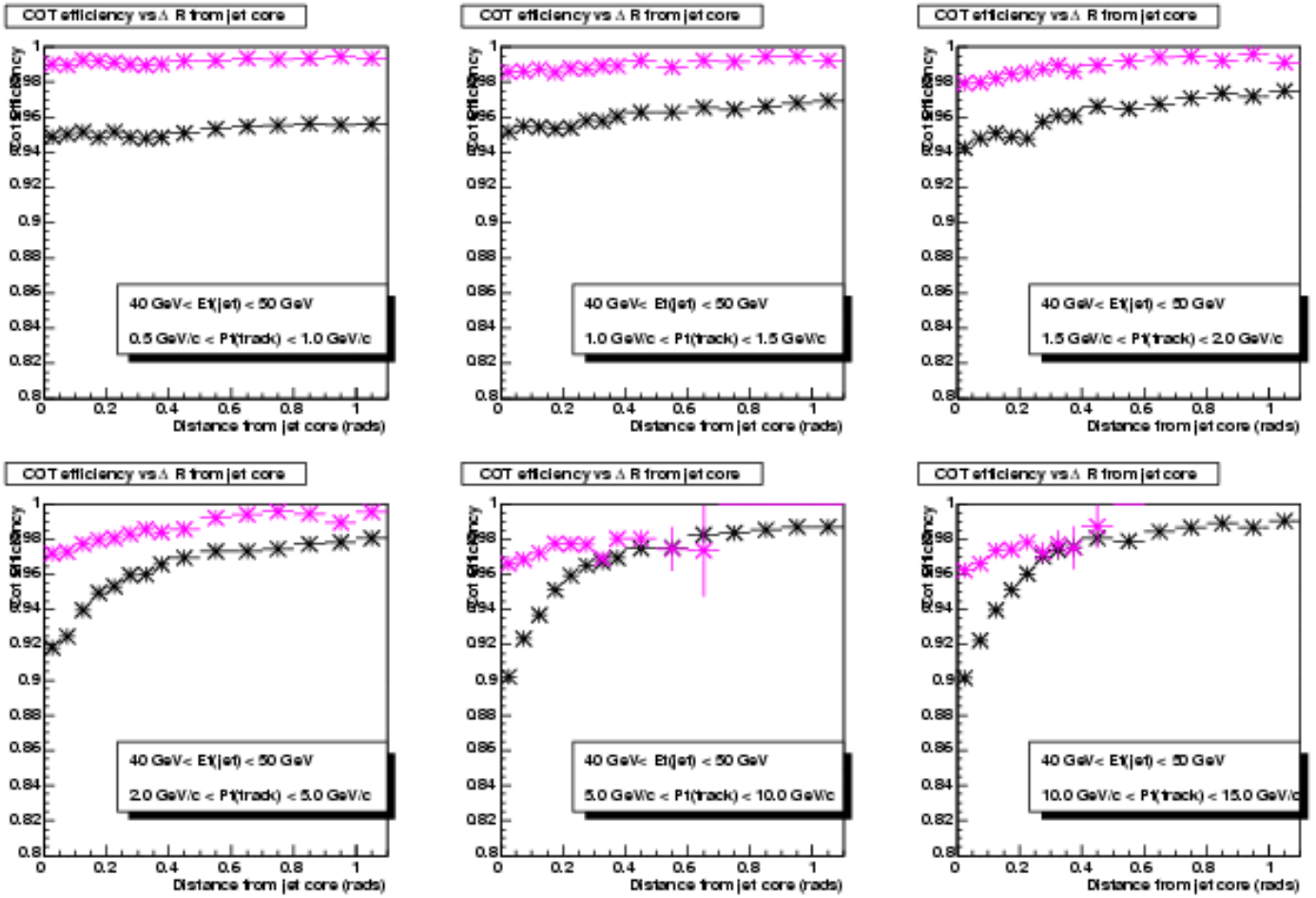
Track Efficiency in Data and MC

MC

DATA



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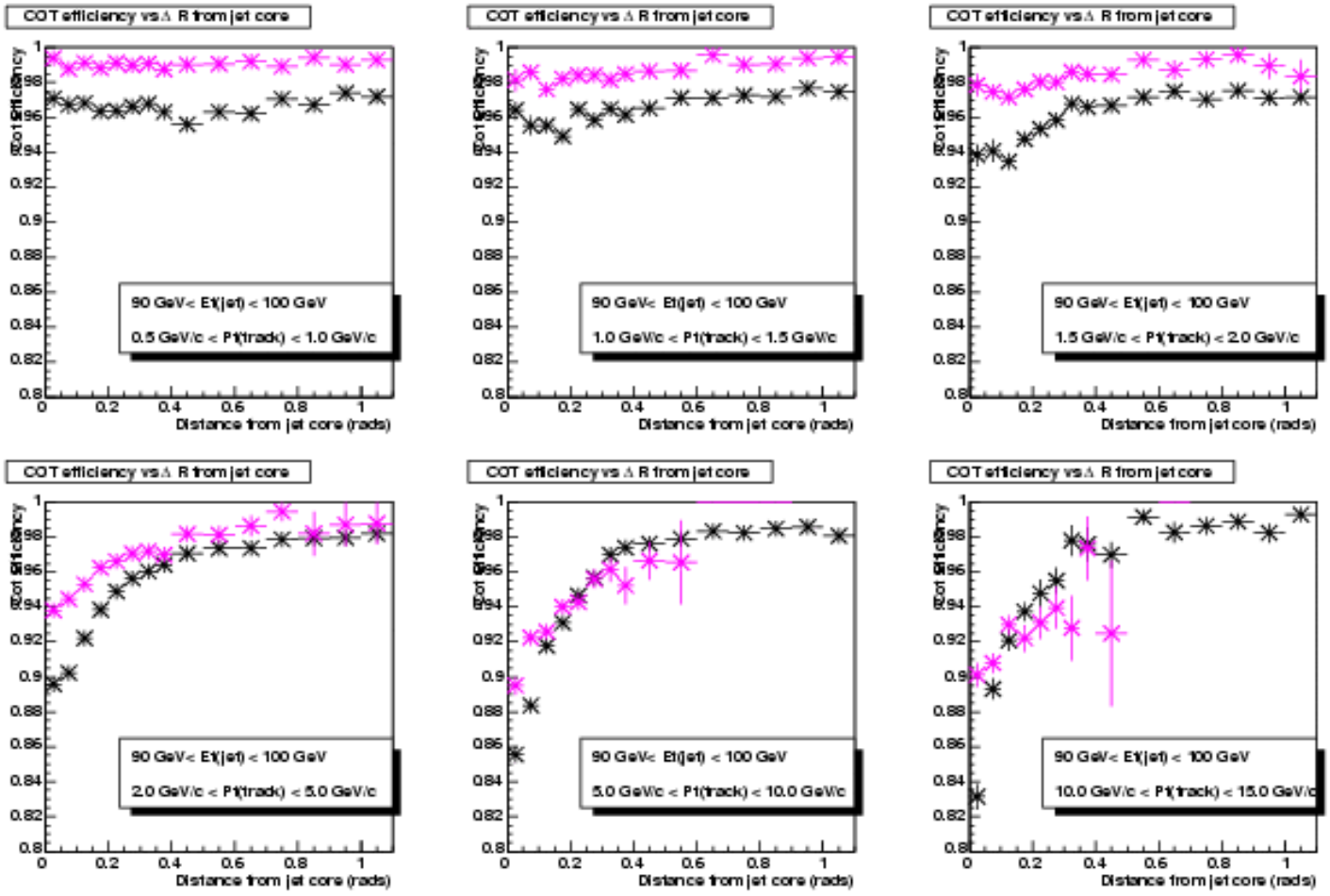
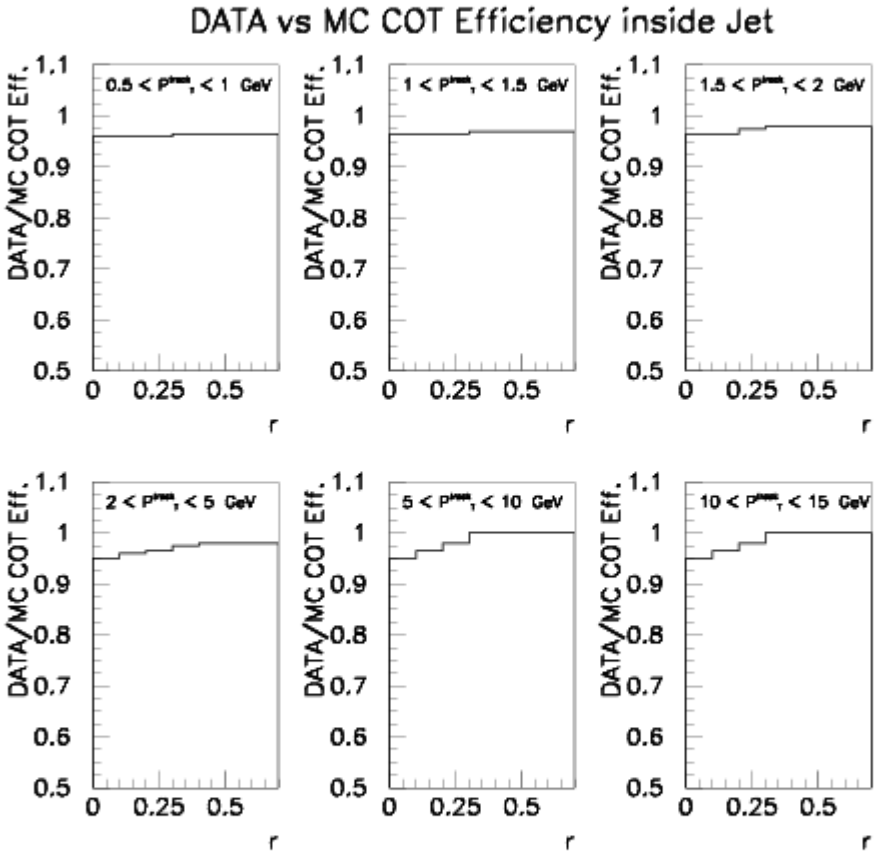
Track Efficiency in Data and MC

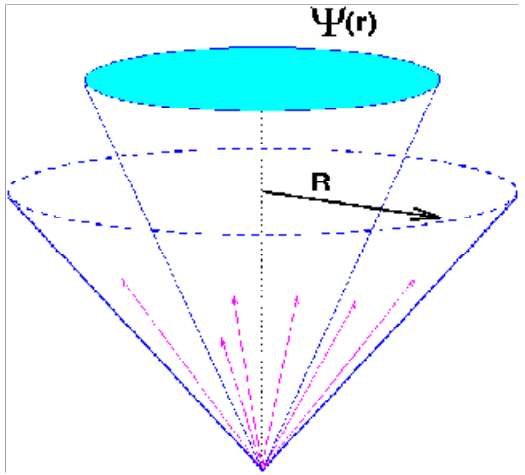
MC

DATA



Modified Jet Shape



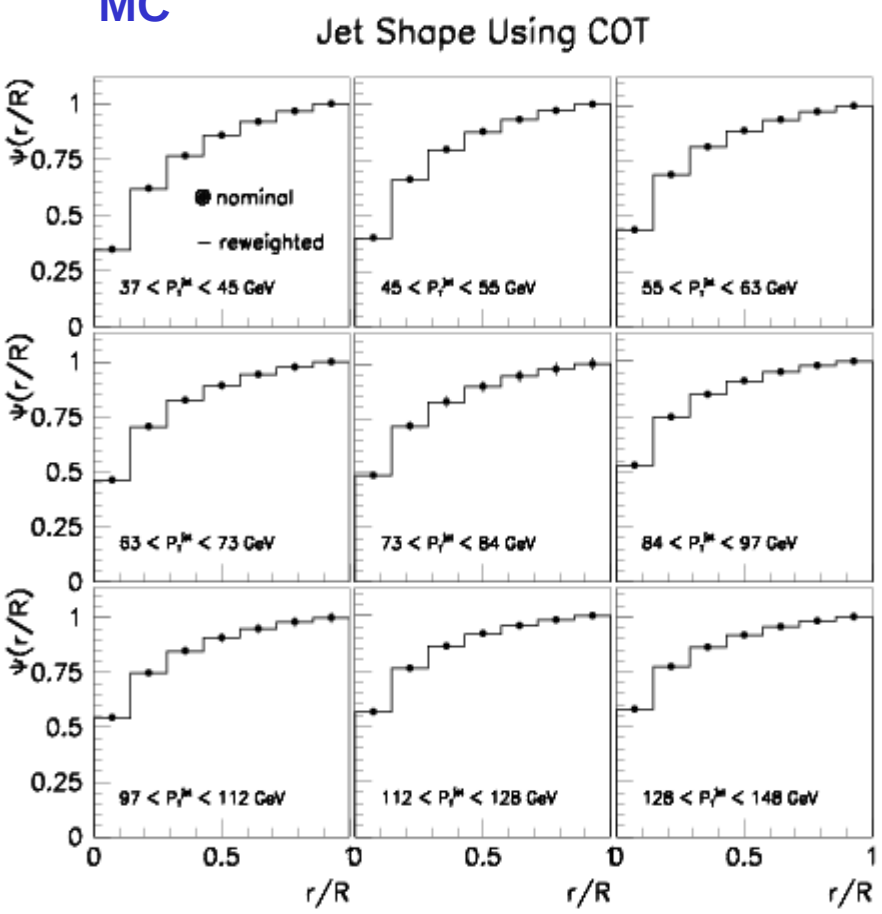


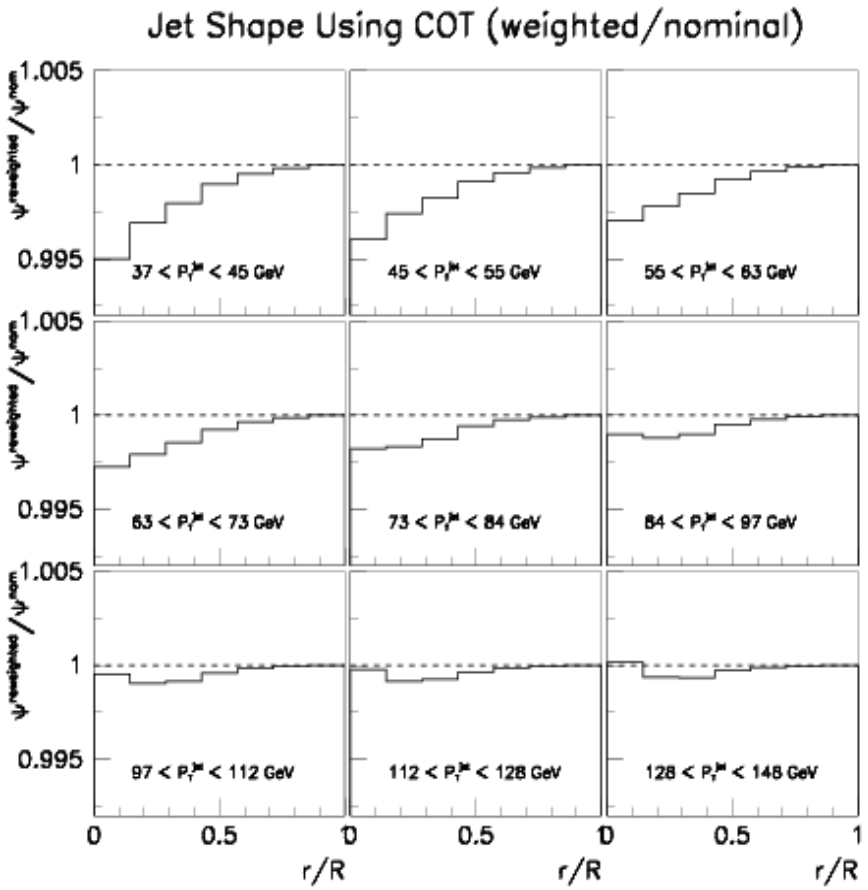
$$\Psi(r) = \frac{1}{N_{jets}} \Sigma_{jets} \frac{\sum_{tracks} p_T^{track}(0,r)}{\sum_{tracks} p_T^{track}(0,R)}$$

$$\Psi(r) = \frac{1}{N_{jets}} \Sigma_{jets} \frac{\sum_{tracks} w \bullet p_T^{track}(0,r)}{\sum_{tracks} w \bullet p_T^{track}(0,R)} \quad , \quad w = w(P_T^{jet}, p_t^{track}, r)$$

Modified Jet Shape

MC





Effect is smaller than 0.5 % → We consider it negligible

→ Thanks to DATA-MC difference is flat inside jet for low pt tracks